

The Ice That Remembers

Every winter leaves a line in the ice. Read the lines and you read the past.

8 min read

Before you read

- **core** — a long tube of material drilled out from below the surface
- **compressed** — pressed tightly together until it takes up less space
- **layer** — one sheet of something lying on top of another
- **trapped** — held in place with no way out
- **ash** — the fine grey powder left behind by burning or by a volcano
- **evidence** — facts that help you work out what is true
- **archive** — a store of records kept so people can look at them later



A drilling camp on the Greenland ice sheet, where the ice is more than two kilometres deep

¹ Snow falls on the ice sheet every winter. In summer a little of it melts and the rest stays. The next winter buries it under fresh snow, and the winter after that buries it deeper still. Year after year the weight above pushes down, until the soft snow at the bottom is **compressed** into hard, clear ice.

² That is the first thing to understand about an ice sheet. It is not one solid block. It is thousands of thin **layers**, stacked in order, with the oldest at the bottom. In some parts of Greenland the stack is more than two kilometres thick, and the ice at the very bottom fell as snow before any city on Earth was built.

³ Scientists cut into that stack with a hollow drill. What comes up is a **core** — a cylinder of ice about the width of your arm, lifted out in sections and stored in freezers so it never melts.

⁴ Hold a section up to the light and you can see the bands, pale and dark, one pair for each year. Counting them is slow work, but it tells you exactly how old the ice is at any depth.



A section of ice core. The pale bands are summer layers.

⁵ The useful part is not the ice itself. It is what the ice caught on its way down. When snow turns to ice, small pockets of air are sealed inside it. Those bubbles hold real air from the year the snow fell. Open one in a laboratory and you are measuring a sky that nobody alive has breathed.

⁶ Other things are **trapped** too. A volcano that erupted on the far side of the world left a thin line of **ash**, and because we often know the year that volcano blew, the ash line becomes a marker that checks the counting. Dust from a dry century, salt carried in from a stormy sea, even lead from factory smoke — all of it settles on the snow and stays where it lands.

⁷ Put the layers together and you have an **archive**. It is not written in words, and nobody made it on purpose, but it keeps better records than most libraries. It cannot be edited later, and it never skips a year.

⁸ Reading it takes care. A warm summer can melt the top of a layer and blur the line between one year and the next. Ice near the bottom has been squashed so flat that a thousand years may be thinner than your finger. So scientists rarely trust one core alone. They drill in several places and compare, and they look for the same ash line turning up in all of them. Agreement between cores is the **evidence**; a single reading is only a clue.

⁹ Which is why the drills keep turning. Every core lifted out of the ice is another copy of the same long story, and the places still holding the oldest ice are getting harder to find.

Part A Choose the best answer

Circle the letter next to the right answer.

1. Why is the ice at the bottom of the sheet harder than the snow at the top?
 - A It is colder down there
 - B The weight of the snow above has pressed it together
 - C It was never snow in the first place
 - D Scientists drilled through it
2. What exactly is an ice core?
 - A A frozen lake sample
 - B The coldest part of the ice sheet
 - C A cylinder of ice drilled out of the sheet
 - D A tool used for cutting ice
3. Why do the air bubbles in an ice core matter to scientists?
 - A They make the ice easier to cut
 - B They hold air from the year that snow fell
 - C They show where the drill went wrong
 - D They keep the core from melting
4. How does a line of volcanic ash help the people counting layers?
 - A It makes the layers easier to see in the dark
 - B It marks a year that is already known, so the count can be checked
 - C It proves the ice sheet is two kilometres thick
 - D It shows which summers were warm
5. Why do scientists drill in several places instead of trusting one core?
 - A Cores are cheap to drill
 - B One drill cannot reach the bottom
 - C Cores that agree with each other are stronger evidence
 - D The freezers can only hold small sections

Part B Write your answer

Answer in two or three sentences.

6. Explain in your own words how one year of weather becomes one layer of ice.

7. The passage says the archive “cannot be edited later, and it never skips a year”. Why does that make ice useful to scientists?

8. Give two reasons from the passage why reading an ice core is difficult, and say which of the two you think causes more trouble.

Part C Think deeper

There is no single right answer here. Say what you think, and say why.

9. The writer calls the ice sheet an archive rather than a block of frozen water. What does that comparison help you understand that the plain description does not? Use one detail from the passage in your answer.

10. The last sentence says the oldest ice is getting harder to find, but it does not say why. What do you think the writer wanted you to work out, and what in the rest of the passage points you there?

Answer key

For parents and teachers

Part A

1. B — the weight above compresses it | 2. C — a cylinder drilled from the sheet | 3. B — they hold air from that year | 4. B — a known year that checks the count | 5. C — agreement between cores is stronger evidence

Part B

6. Snow falls in winter, some melts in summer, the rest is buried by the next winter's snow and compressed into ice — one pale/dark band per year. Accept any answer with the sequence fall → bury → compress, even without all three terms.

7. Because the record is complete and nobody can change it afterwards, so scientists can trust the order and the gaps. Accept answers focused on either point — unchangeable, or continuous.

8. Any two of: summer melting blurs the line between years; deep ice is squashed so a thousand years may be very thin. The judgement in the second half is the point — accept either choice with a reason.

Part C

These answers vary. Mark the reasoning, not the answer.

9. A strong answer explains that “archive” carries the idea of stored records kept in order and readable later, which “frozen water” does not, and backs it with a detail (bubbles of old air, ash lines, bands per year). A weaker answer repeats the word archive without saying what it adds. Prompt with: what does an archive do that a block of ice does not?

10. The intended inference is that the ice is melting, so old layers are being lost. Clues: melting is mentioned twice, and the warming theme sits behind the measuring of old air. Credit any inference the child can trace back to a line in the text; the skill being marked is linking a conclusion to evidence, not guessing the writer's exact meaning.

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